

100% endemism in mesophotic reef fish assemblages at Kure Atoll, Hawaiian Islands

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The Hawaiian Archipelago is one of the most isolated island chains on Earth, and is known for a high proportion of endemism in its coral-reef fish fauna (Randall 2007). In the Northwestern Hawaiian Islands (NWHI), percent endemism based on numerical densities increases with latitude on shallow coral reefs (<30 m), and peaks at 62 % at Pearl and Hermes Atoll (Friedlander et al. 2009). On mesophotic reefs (50–80 m) of the NWHI, endemism was also found to increase with latitude, reaching a peak of 92 % at Midway Atoll (Kane et al. 2014).

Here, we report the highest levels of endemism recorded from the deepest coral reefs at the northernmost atoll in the world. Surveys of mesophotic coral-reef fish assemblages were conducted using closed-circuit mixed-gas rebreathers at depths of 86–91 m at six different sites off Kure Atoll (28°40'N, 178°30'W), between September 15 and 21, 2015 (Fig. 1a). Diver transect methods were identical to those of Kane et al. (2014),

and utilized a 25 × 2 m visual survey at each site. These surveys represent the deepest quantitative coral-reef fish assessments ever conducted in the NWHI. Totals of 463 individuals of 17 genera and 22 species were recorded. All six surveys recorded 100 % endemism, with no non-Hawaiian species noted (Fig. 1b).

Endemism is a key attribute of natural communities and is of great importance to the conservation of global biodiversity. Within the Hawaiian Archipelago, which is already considered to be a hot spot of biodiversity, the mesophotic reefs of the NWHI represent the highest endemism portion of this hot spot. Endemic species are important contributors to global biodiversity, but their restricted geographic ranges make them more vulnerable to extinction (Roberts et al. 2002). This underscores the importance of the protection afforded by large marine protected areas such as the Papahānaumokuākea Marine National Monument, which encompasses the NWHI.

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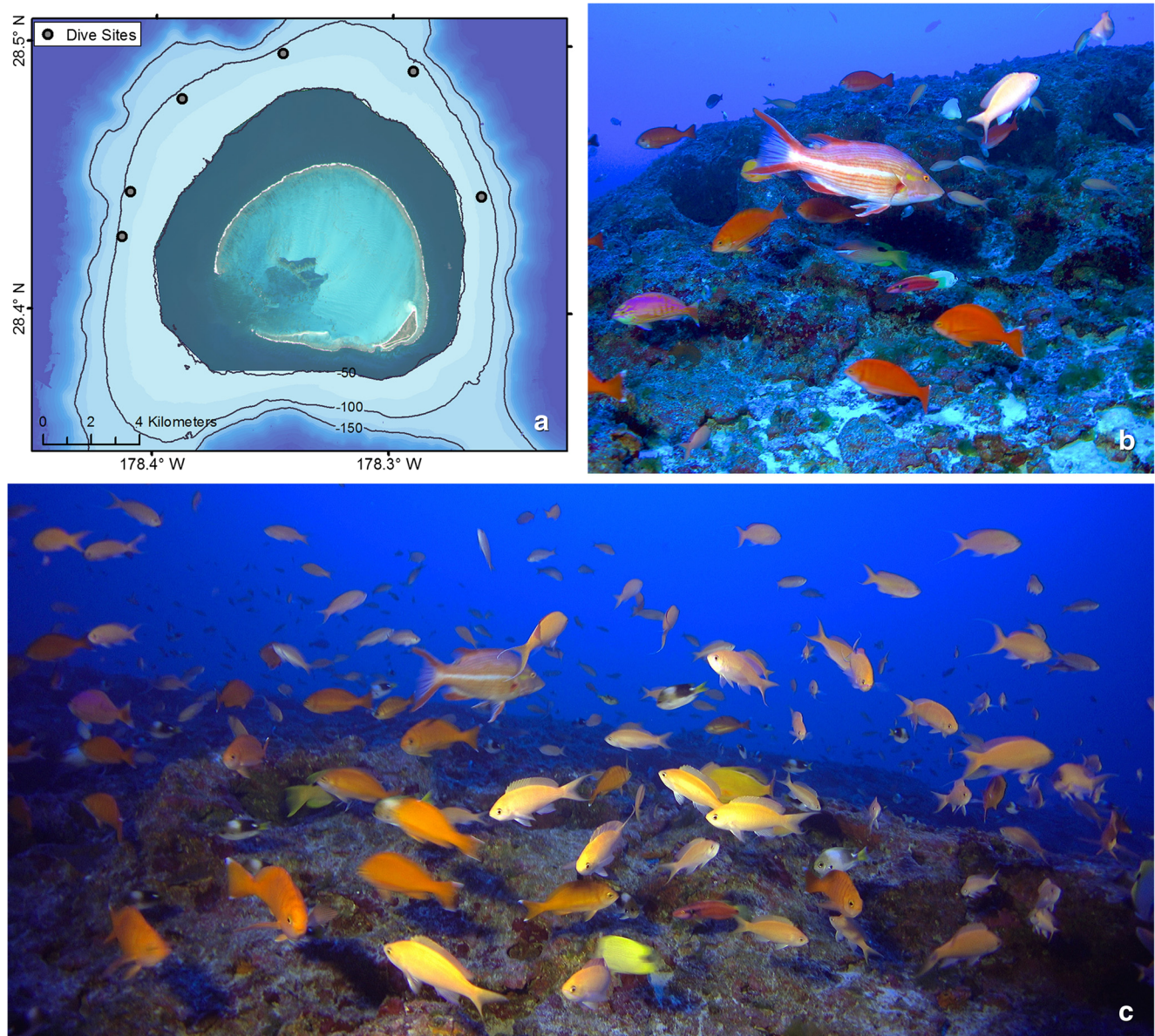


Fig. 1 **a** Location of mesophotic fish survey sites around Kure Atoll; **b, c** 100 % endemic reef fish assemblage at 90 m, including *Pseudanthias thompsoni*, *Odontanthias fuscipinnis*, *Caprodon unicolor*, *Chromis*

struhsakeri, *Genicanthus personatus*, *Chaetodon miliaris*, *Bodianus albotaeniatus*, *B. bathycapros*, and *B. sanguineus*

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